



Head Office – Amway House, 71 Dock Road, Cape Town, 8001. Private Bag X7, Waterfront 8002. Telephone +27 (0)21 405-1700. Facsimile +27 (0)21 425 0705.
Cape Town ABC – Ground Floor, Amway House, 71 Dock Road, Cape Town, 8001. Telephone +27(0)21 405 1756/7 Facsimile +27(0)21 405 1760.
Johannesburg ABC – 12 Friesland Drive, Longmeadow Business Estate South, Longmeadow. Telephone +27 (0)11 201 4400. Facsimile +27 (0)11 201 4401/2.
Johannesburg Warehouse – Unit B1, Cnr Loper & Brussels Rd, Spartan, Ext.2, Aeroport, 1619. Telephone +27 (0)11 923 0850. Facsimile +27 (0)11 392 7712.
Website: www.amway.co.za

Amway South Africa L.L.C.,
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BIOAVAILABILITY

Bioavailability refers to the ability of a nutrient to pass from the intestinal tract into the body's circulation (absorption) and travel to the cells. The bioavailability of a vitamin or mineral in a dietary supplement depends upon many different factors:



- 1. The material that is selected to provide the vitamin or mineral potency.** There are different ingredients to choose from when formulating vitamin and mineral supplements. Some vitamins have two or three active forms. Minerals are rarely found alone in nature – they are usually found in the form of salts or attached to other small compounds. The different forms may not behave the same way in the intestinal tract and there may be significant advantages of using one over another. Nutrilite Formulators are careful to select the forms that are well absorbed and well tolerated by the body.
- 2. The amount of the nutrient that is present in the tablet or capsule.** In general, as the amount of nutrient present increases, the percent of the nutrient that is actually absorbed into the body decreases. For example, nearly 100% of a small dose of vitamin C will be absorbed under normal circumstances. But the absorption drops to 50% when large doses are consumed. For most nutrients, the body has a limit on how much can be absorbed at one time. For that reason, most Nutrilite products are designed to be eaten two or more times per day.
- 3. The presence of other ingredients in the formula.** Dietary supplements usually have several ingredients in addition to the vitamin and/or mineral containing ingredients. These other ingredients are necessary in order to properly blend the ingredients, compress (form) the tablets, and ensure that the tablet will break up in the stomach. The tablet must disintegrate (fall apart) in the stomach in order for the nutrients to be absorbed. Some ingredients will enhance the bioavailability of the nutrient, but other ingredients may interfere with the bioavailability. When Nutrilite scientists formulate the products, they use ingredients, which will aid in the bioavailability of the nutrients.
- 4. The methods used to make the tablets.** Tablets are made by compressing a powdered material between two punches. The pressure required to form the tablets is very high. But using excessive pressure can cause the tablet to become too hard and it will take longer to disintegrate in the stomach. If the tablet does not disintegrate while in the stomach, the bioavailability decreases. During the development of new or revised products, Nutrilite formulators experiment with such things as tablet shape and compression pressure to come up with the most favourable bioavailability and stability.
- 5. Foods or beverages that are consumed with the supplements.** The presence of food in the stomach causes a number of changes. The stomach produces more acid and acidified mass of food in turn triggers the release of various intestinal hormones, digestive juices and enzymes. After the meal is eaten, it usually stays in the stomach for 2-3 hours. Liquids leave the stomach more quickly, but high fat meals take longer to leave the stomach. The food then slowly enters the small intestine where the majority of digestion and absorption takes place. Food takes anywhere from 3 to 10 more hours to pass through the small intestine. The longer the food stays in the intestine, the greater the absorption of vitamins and minerals. Because supplements do not typically supply fats, carbohydrates, proteins, calories or physical mass required to trigger the digestive process, Nutrilite recommends that the supplements be eaten with food. The goal of supplementation is to add more vitamins and minerals to the diet and eating the supplements with food may enhance the absorption of these nutrients.
- 6. When the supplements are consumed.** Individual vitamins and minerals are absorbed at specific sites along the intestinal tract. At these sites, the nutrient passes from the intestine into the bloodstream. If large amounts of a nutrient are present in that portion of the intestinal tract, the absorption sites can become saturated and some of the nutrients pass through unabsorbed. Because most nutrients show greater absorption with lower doses, it makes sense to supplement with several smaller doses than to eat a single large dose that can overwhelm the absorption capability of the body. The Nutrilite concept of food supplementation is to supplement regular meals with vitamins, minerals and other factors

that may be missing from the typical diet. The suggested usage for Nutrilite products is to eat the product 2 to 3 times throughout the day rather than all at one time.

7. **The age, health and nutritional status of the individual.** Nutrilite works hard to create products with excellent bioavailability. However, there is a great deal of variability among individuals in terms of absorption and utilisation of nutrients. Those who have nutrient deficiencies are likely to absorb greater amounts of nutrients from their food than those who are well nourished. Elderly individuals may not be able to absorb certain vitamins and minerals as well as they did when they were younger. In addition, some medical conditions and prescribed drugs may interfere with the absorption and utilisation of nutrients.

NOTE:

- Nutrilite does not conduct bioavailability clinical studies on each supplement formula. Because of the prohibitive cost, the number of different formulas throughout the world and the difficulty in conducting these types of studies in humans, Nutrilite chooses to apply bioavailability research published by scientists to our formulas.
- Nutrilite also performs extensive physical and chemical testing to estimate the bioavailability of the products.
- All batches of Nutrilite swallowable tablets are tested for disintegration times before they are released for shipment. Disintegration time measures how many minutes it takes for the tablet to break up in a liquid and it is the best single indicator of bioavailability.
- The chewable tablets do not undergo disintegration testing, because the tablet is physically broken up during the chewing process.